REMARKS:

Claims 1-31 are in the case and presented for consideration.

Claim 1 has been amended to make it clear that the copper surfaced first part is adapted to be mechanically and electrically connected to the metal surface of a second part. The mechanical and electrical connection distinguishes the invention both functionally and structurally from the prior art of record in a manner which is believed novel and unobvious.

Turning to the action, a correction has been made to claim 25 to correct an error which was correctly pointed out by the Examiner.

The Examiner has also rejected claims 1, 3-7 and other claims as being fully anticipated by U.S. Patent 5,486,277 to Barbee, Jr., et al (hereafter Barbee). Claims 1, 2, 8, 10 and 27 have also been rejected as fully anticipated by U.S. Patent 6,335,569 to Joshi.

Turning first to the Barbee reference, Fig. 3 of that reference discloses a capacitor having a dielectric layer 27 between two copper parts 26. Although dielectric layer 27 is amorphous and made, for example, of SiO_2 or titanium dioxide or calcium titanol or other compounds appearing in the list of materials in claim 1 of the present application, Barbee would not anticipate nor render obvious the mechanical and electrical connection between the two copper parts 26 since that would defeat the purpose of Barbee which is to provide a capacitor. Barbee thus cannot be said to comprise a first part having a copper surface and adapted to be mechanically and electrically connected to the metal surface of a second part.

Claim 2 even more positively defines this feature. Please see the current specification at page 3, paragraph [0012] which states the requirement for the copper surface to be mechanically and electrically connected to the metal surface of the second part.

Reviewing Fig. 3 of Barbee and the disclosure of Barbee in the paragraph bridging columns 9 and 10, Barbee discloses a capacitor with a dielectric layer 27 which forms a separating dielectricum of the capacitor between the conductive plates of the capacitor which are made of the respective copper surfaces of parts 26. It is clear that none of the copper surfaces to which the dielectric is applied are intended to be electrically connected to the metal surface of a second part of the capacitor. If the electrical connection were to be made across the dielectric layer, this would represent a short circuit and defeat the capacitor function intended by Barbee.

Thus, none of the copper surfaces of Barbee carrying a dielectric layer is intended or disclosed to be mechanically or electrically connected to a metal surface of a second part. To the contrary, Barbee's teaching of the use of the dielectric layer to produce a capacitor requires the perfect electrical isolation between the copper surfaces and this is clearly contrary to claim 1.

The claims which depend from claim 1 and have also been rejected as anticipated or obvious from Barbee taken alone or in combination with the secondary references, are likewise believed unobvious since Barbee's teaching inescapably requires no electrical connection between the copper surface of a first part and the metal surface of a second part, passed or through the dielectric layer.

Turning now to the Joshi reference, Fig. 8 of this reference as discussed in column 11, lines 6-55 of Joshi, teaches an M2 level copper 100 connected to an M1 level copper 102 by way of a "via 104" which is formed in two stages.

Via 104 is formed on top of metal layer 102 within a diffusion barrier layer which has no reference number in Fig. 8, but is clearly shown. Diffusion barrier (see column 11, line 7) is a thin amorphous barrier layer. The line forming such layer is made, e.g., of W-Si-N. The structure of Figs. 7 and 8 are made in single "damascene" structure. With respect to damascene technology, please refer to the enclosed article "Copper for advanced interconnect", Proceedings of the Third International Workshop on Materials Science. This article clearly discloses that damascene patterning involves first patterning the oxide, then depositing the barrier/metal layer. Thus, turning back to Fig. 8, the bottom oxide is patterned, then the hard layer, the barrier layer is deposited, then copper 102 is deposited. Then, after the upper oxide which has been patterned is applied to the bottom oxide, again first the hard barrier layer is deposited and then the metal of via 104. Thereafter again, the top hard material barrier layer is deposited and then copper 100.

Thus, the top surface of copper 102 is clearly not intended or structured to come into electrical contact with the metal of via 104, which would necessitate an electric break through the intermediate hard material barrier layer. Identically, the top surface of via 104 is clearly not intended to come into electrical contact with copper 100, which again would necessitate an electrical break through the top hard material barrier layer.

It is not seen how the Examiner has concluded that the addressed passage of Joshi may teach any bonding of a copper surface to a metal surface of the second part, where no bonding exists at all.

Joshi always provides a hard material layer between a copper surface and an adjacent metal surface, so that none of Joshi's copper surfaces which are covered with a hard layer are taught to be for mechanically and electrically connecting a copper surface of a first part to a metal surface of a second part.

Therefore, claim 1 does not read on Joshi, and Joshi would not anticipate or obviate this claim, where a copper surface which is to be bonded to a metal surface of a second part is covered by a hard layer. This contacting necessitates opening or breaking through the hard layer to allow electrical and mechanical connection of the copper surface to a metal surface of another part.

The dependent claims are also believed to further distinguish the invention over Joshi alone or in combination with the secondary references.

By this amendment, the application and claims are believed to be in condition for allowance.

The undersigned intends on calling the Examiner for a telephone interview at an appropriate point after this amendment has been considered.

The Examiner is also respectfully invited to telephone the undersigned to expedite the prosecution of this application.

Favorable action is respectfully requested.

Respectfully submitted,

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